UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/554,039	10/20/2005	Dennis Barket JR.	GR61-043	1055

7590 03/17/2008

Wells St. John P.S.
601 W. First Ave., Suite 1300
Spokane, WA 99201

EXAMINER	
LEYBOURNE, JAMES J	
ART UNIT	PAPER NUMBER
2881	

MAIL DATE	DELIVERY MODE
03/17/2008	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/554,039	BARKET ET AL.	
	Examiner	Art Unit	
	JAMES J. LEYBOURNE	2881	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☐ Responsive to communication(s) filed on _____.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-51* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-4,7,8,12-19 and 27-50* is/are rejected.

7)☒ Claim(s) *5,6,9-11,20-26 and 51* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☒ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *20 October 2005* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *10/20/06;10/10/06 and 10/03/07*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Drawings

1. The drawings are objected to because in Fig. 2, S28, "SECOND SAMPLE" should be "FIRST SAMPLE". Corrected drawing sheets in compliance with 37 CFR 1.121 (d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Claim Objections

2. Claim 22 is objected to because of the following informalities: In line 1, delete "of".

3. Claim 44 is objected to because of the following informalities: In line 2, "firs" should be "first". Appropriate correction is required.

Claim Rejections - 35 USC § 102

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

5. Claims 1, 3, 7, 14, 16, 19, 27-36, 39 and 40 are rejected under 35 U.S.C. 102(b) as being anticipated by Bomse et al. (USPN 5,015,848).

6. Regarding claims 1, 3 and 36, Bomse et al. discloses a mass spectrometer (instrument) in which an ionization source uses changes in ionization source conditions, for example ionization energy, thus producing large changes in ion yield (sample characteristic) over a small energy increment (column 5, lines 42-47). The

changes in ion abundances are quantified by using either analog electronic circuitry (processing circuitry) or digital computer processing utilizing mathematical transforms (column 5, lines 52-58).

7. Regarding claims 7and 40, Bomse et al. discloses a mass spectrometer (apparatus) in which the ionization source uses changes in ionization source conditions, for example ionization energy, thus producing large changes in ion yield (sample characteristic) over a small energy increment (column 5, lines 42-47). The mass spectrometer comprises a structure for detecting and quantifying the ions generated (column 3, lines 62-65). The changes in ion abundances are quantified by using either analog electronic circuitry (processing circuitry) or digital computer processing utilizing mathematical transforms (column 5, lines 52-58).

8. Figures 1-3, show data representing change in ion yield as a function of changing ionization energy for two similar substances. As discusses in column 6, lines 10-15, the ionization energies for the two analytes are different and the sample characteristics of the analytes are mass spectra.

9. Regarding claim 19, Bomse et al. teaches an analysis method comprising generating ionization of one or more components within an analyte, mass filtering or analyzing the ions generated, detecting and quantifying the mass filtered ions of the components generated as a function of time and producing output signals representative thereof and processing the output signals to provide a two-dimensional mass spectrum (col. 2, lines 23-30).

10. Regarding claims 14, 16 and 40, the preferred embodiment uses periodic sinusoidal modulation of the electron energy of an electron impact ionization source in a mass spectrometer. The ion signal at each mass appears as a waveform in time (col. 5/6, lines 66-5).

11. Regarding claims 27-35, the mass spectrometer of Bomse et al. includes a micro- computer 26 (Fig. 4 and col. 5, lines 45-50) to store and process data sets (col. 7, lines 25-63). As discussed with respect to claims 7, 8, 14, 16 and 19 above, the reference samples characteristics comprise mass spectra generated with a plurality of acquisition parameters such as ionization energy and mass separation components such as separation waveforms.

12. Claims 36-42 rejected under 35 U.S.C. 102(b) as being anticipated by Bateman et al.

13. Regarding claims 36-42, Bateman et al. discloses a sample analysis method using a tandem TOF mass spectrometer in which first and second data sets are generated using an analyte modification component, viz. low and high (unequal) collision energy (analytical parameter), to record mass spectra. The sample uses the first and second data sets to identify the sample by associating fragment associated with parent. [0017].

14. Regarding claim 41, the analytical parameter may be an analyte modification component, viz. collision energy [0017].

15. Regarding claim 42, the mass separation parameter for the first and second data sets can be the same, i. e., elution times [0017, lines 7-10].

Claim Rejections - 35 USC § 103

16. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

17. Claims 2, 12, 15 and 17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Bomse et al. as applied to claims 1, 7.

18. Regarding claims 2, 12 and 17 Bomse et al. teaches using an electron impact ionization source (column 4, lines 39-40). Bomse et al. does not specify the energy to use with any particular ionization. However, the electron impact energy would depend on the type of analyte and could be determined through routine experimentation by one of ordinary skill in the art.

19. Regarding claim 15, Bomse et al. does not teach the mass spectrometer has storage circuitry for a plurality of data sets, each of the data sets comprising a reference sample characteristic associated with one of the first or second ionization energies. However, Bomse et al. teaches the data are analyzed by comparison to reference data

from a two-dimensional mass spectral data base (col. 4, lines 17-20). It is inherent that data storage is needed for the reference data base.

20. Claims 4, 8 and 42-49 are rejected under 35 U.S.C. 103(a) as being unpatentable over Bateman et al.

21. Regarding claims 4, 8 and 46, Bateman et al. teaches that in a tandem mass spectrometer parent ions are generated from a sample and selected by a first mass filter/analyzer (this is a first processing circuitry that provides a first sample characteristic). The mass spectra of the parent ions comprises a first data set. The selected parent ions are then passed to a collision cell wherein they are fragmented by collisions with neutral gas molecules to yield daughter ions [0004]. As known in the art, ions are generated from a sample by applying some form of ionization energy. Fragmenting by the collision cell provides different ionization energy and the second mass analysis results in daughter ion spectra (second sample characteristic). The resulting daughter ion spectra are used to determine the parent ions [0004].

22. Regarding claims 45-47, it is inherent that the first analyte modification parameter value of the first set does not equal the first mass separation parameter value of the second data set and that different ionization energies are used.

23. Regarding claims 44 Bateman et al. teaches a complete daughter ion spectrum for each of the parent ion mass-to-charge ratios which produce characteristic daughter ions may be obtained by operating the first mass filter/analyser so that it selects parent ions having a particular mass-to-charge ratio, and scanning the second mass filter/analyser to record the resulting full daughter ion spectrum [0005]. In order to

select a particular mass to charge ratio it is known in the art to select a range about the nominal desired mass to charge ratio in order to allow for energy spread in the source ions.

24. Regarding claim 48 and 49 Bateman et al. teaches in a parent ion scanning tandem mass spectrometer, the second mass filter/analyser is arranged to act as a mass filter that only transmits and detects daughter ions having a specific mass-to-charge ratio. The specific mass-to-charge ratio is set so as to correspond with the mass-to-charge ratio of daughter ions which are known to be characteristic products which result from the fragmentation of a particular parent ion or type of parent ion [0005].

25. Regarding claims 42 and 43, the mass separation mass separation parameters are the same, viz. mass to charge ratio. Bateman et al. does not explicit state that the parameter value of the first data set does not equal the first mass separation parameter value of the second data set. Since the daughter ions have a different mass than the parent, it would be obvious to one of ordinary skill in the art that different parameter values would be used.

26. Claims 13, 14 and 18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Bomse et al. as applied to claims 1 and 7 above, and further in view of Bateman et al.

27. Bomse et al. teaches the limitations of claim 7 but does not teach a first ionization energy source that uses electron impact ionization and a second ionization source that uses chemical ionization energy. Bomse et al. also does not teach the first

ionization energy is supplied at a first moment in time and the second ionization energy is supplied at a second moment in time or that the mass separator is an ion trap.

28. Bateman et al. teaches that an ion trap type mass spectrometry apparatus that switches between electron impact ionization and chemical ionization in the ion source has been proposed. An ion trap type mass spectrometry apparatus can trap ions of a specific mass by a structural unit serving both as the ion source and mass spectrometry unit, so alternately ionizes the gas and analyzes the mass [0004].

29. It would be obvious to one of ordinary skill in the art to use the ionization sources or Bateman et al. in the apparatus of Bomse et al. because Bateman et al. teaches only the ions desired to be measured and analyzed are roughly separated and ejected to the mass spectrometry unit [0007].

30. Claim 50 is rejected under 35 U.S.C. 103(a) as being unpatentable over Bateman et al. as applied to claims 36 and 41 above, and further in view of Bomse et al.

.

31. Bateman et al. discloses a sample analysis method using a tandem TOF mass spectrometer in which first and second data sets are generated using an analyte modification component, viz. low and high (unequal) collision energy (analytical parameter), to record mass spectra. The sample uses the first and second data sets to identify the sample by associating fragment associated with parent. [0017]. Bateman et al. does not teach providing a reference data set comprising the sample characteristics of a reference; and comparing the reference data set to the sample data set.

32. Bomse et al. teaches that, in a parent scanning tandem mass spectrometer, the specific mass-to-charge ratio of the mass analyzer for the parent ions is set so as to correspond with the mass-to-charge ratio of daughter ions which are known to be characteristic products which result from the fragmentation of a particular parent ion or type of parent ion [0005].

33. It would be obvious to one of ordinary skill in the art to use a reference data set as taught by Bomse et al. in the method of Bateman et al. because Bomse et al. teaches parent ion scanning is useful when it is not possible to identify parent ions in a direct mass spectrum due to the presence of chemical noise, which is frequently encountered [0005].

Allowable Subject Matter

34. Claims 5, 6, 9-11, 20-26 and 51 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

The following is a statement of reasons for the indication of allowable subject matter:

35. Regarding claim 5, the prior art fails to disclose or make an instrument comprising:

- an ionization source configured to apply different ionization energies to a sample to provide different sample characteristics

- processing circuitry to access at least two data sets of the different sample characteristics and at least two sets of reference sample characteristics, one of the data sets of the reference sample characteristics comprising a third reference sample characteristic associated with the first ionization energy and another of the two data sets of the reference sample characteristics comprising a fourth reference sample characteristic associated with the second ionization energy.

36. Claim 6 would be allowed by virtue of its dependency on claim 5.

37. Regarding claim 9, the prior art fails to disclose or make obvious a mass spectrometer comprising:

- an ionization component configured to receive a sample and provide a first ionization energy to form a first ionized analyte and a second ionization energy to form a second ionized analyte, wherein the first and second energies are not equal

- a detection component configured to detect the first and second ionized analytes formed by the ionization component

- processing circuitry to associate detection of the first ionized analytes with a first sample characteristic and detection of the second ionized analytes with a second sample characteristic and to associate both the first sample characteristic with the first ionization energy, and the second sample characteristic with the second ionization energy to identify a sample, wherein

the processing circuitry is further configured to prepare a sample data set comprising first and second data sets, the first data set comprising the first mass spectra associated with the first ionization energy and the second data set comprising second mass spectra associated with the second ionization energy and the second data set comprising reference data comprising third and fourth data sets, the third data set comprising a third mass spectra and the first ionization energy and the fourth data set comprising a fourth mass spectra and the second ionization energy, wherein the third mass spectra was acquired at the first ionization energy and the fourth mass spectra was acquired at the second ionization energy

- storage circuitry to store the reference data comprising the third and fourth data sets.

38. Claims 10 and 11 would be allowed by virtue of their dependency on claim 9.

39. Regarding claim 20, the prior art fails to disclose or make obvious a mass spectrometer of comprising:

- a first analyte modification component that provides both a first and second ionization energy to a sample to form two groups of ionized analytes;
- a first mass separation component that provides separation waveforms to separate the first and second groups of ionized analytes, by mass-to-charge ratio ranges;

- a second analyte modification component that provides both a third energy to the first and second ranges of ionized analytes to form a third group of ionized analytes, and a fourth energy to the first and second ranges to form a fourth group of ionized analytes;

- a second mass separation component that provides both a third separation waveform to separate a third mass-to-charge ratio range of the third group of ionized analytes and a fourth separation waveform to separate a fourth mass-to-charge ratio range of the fourth group of ionized analytes, wherein at least one of the first and second or third and fourth ionization energies, or the first and second or third and fourth separation waveforms are not equal;

- a detection component that detects the ionized analytes of the third and fourth ranges of ionized analytes received from the second mass separation component; and

- processing circuitry that associates the ionized analytes of the third range with a first sample characteristic and associates the ionized analytes of the fourth range with a second sample characteristic and further correlates both the first sample characteristic with one or more of the first ionization energy, the first mass separation waveform, the third energy and the third mass separation waveform, and the second sample characteristic with one or more of the second ionization energy, the second mass separation waveform, fourth ionization energy, and the fourth separation waveform.

40. Claim 21 would be allowed by virtue of its dependency on claim 20.

41. Regarding claim 22, the prior art fails to disclose or make obvious a mass spectrometer comprising:

- a first analyte modification component to receive a sample and provide both a first ionization energy to the sample to form a first group of ionized analytes, and provide a second ionization energy to the sample to form a second group of ionized analytes;
- a first mass separation component to receive the first and second groups of ionized analytes and provide both a first separation waveform to separate a first mass-to-charge ratio range of the first group of ionized analytes, and provide a second separation waveform to separate a second mass-to-charge ratio range of the second group of ionized analytes;
- a second analyte modification component configured to receive the first and second mass-to-charge ratio ranges of ionized analytes and provide both a third energy to the first and second ranges of ionized analytes to form a third group of ionized analytes, and provide a fourth energy to the ranges to form a fourth group of ionized analytes;
- a second mass separation component configured to receive the third and fourth groups of ionized analytes and provide both a third separation waveform to separate a third mass-to-charge ratio range of the third group of ionized analytes and provide a fourth separation waveform to separate a

fourth mass-to-charge ratio range of the fourth group of ionized analytes, wherein at least one of the first and second or third and fourth ionization energies, or the first and second or third and fourth separation waveforms are not equal; a detection component configured to detect the ionized analytes of the third and fourth ranges of ionized analytes received from the second mass separation component; and

- processing circuitry configured to monitor the detection component and associate detection of ionized analytes of the third range with a first sample characteristic and associate detection of ionized analytes of the fourth range with a second sample characteristic, wherein the processing circuitry is further configured to correlate both the first sample characteristic with one or more of the first ionization energy, the first mass separation waveform, the third energy and the third mass separation waveform, and the second sample characteristic with one or more of the second ionization energy, the second mass separation waveform, fourth ionization energy, and the fourth separation waveform.

42. Claims 23-26 would be allowed by virtue of their dependency on claim 22.

43. Regarding claim 51, the prior art fails to disclose or make obvious a sample analysis method comprising: generating a sample data set from a sample, wherein the sample data set comprises a first and second data sets, wherein each of the first and second data sets comprises an analytical parameter value and a mass spectra

acquired using the analytical parameter value, wherein the analytical parameter value of the first set is different than the analytical parameter value of the second set;

- providing a reference data set comprising third and fourth data sets, the third data set comprising the analytical parameter value of the first set and mass spectra of a reference sample generated using the analytical parameter value of the first set, and the fourth data set comprising the analytical parameter value of the second set and mass spectra of the reference sample generated using the analytical parameter value of the second set.
- identifying the sample by comparing the sample and reference data sets by applying an algorithm to both the mass spectra of the first data set and the third data set, and the mass spectra of the second data set and the fourth data set, using an algorithm that compares mass spectra and provide a first match value of the mass spectra of the first data set and the mass spectra of the third data set and a second match value of the mass spectra of the second data set and the mass spectra of the fourth data set.

Conclusion

44. Any inquiry concerning this communication or earlier communications from the examiner should be directed to JAMES J. LEYBOURNE whose telephone number is (571)272-2478. The examiner can normally be reached on M_F 1:00PM - 5:00 PM.

45. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Robert H. Kim can be reached on 571 272-2293. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

46. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

March 3, 2008

JJL

/ROBERT KIM/

Supervisory Patent Examiner, Art Unit 2881